DAP Prototype Preliminary Design (DRAFT)

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Outline

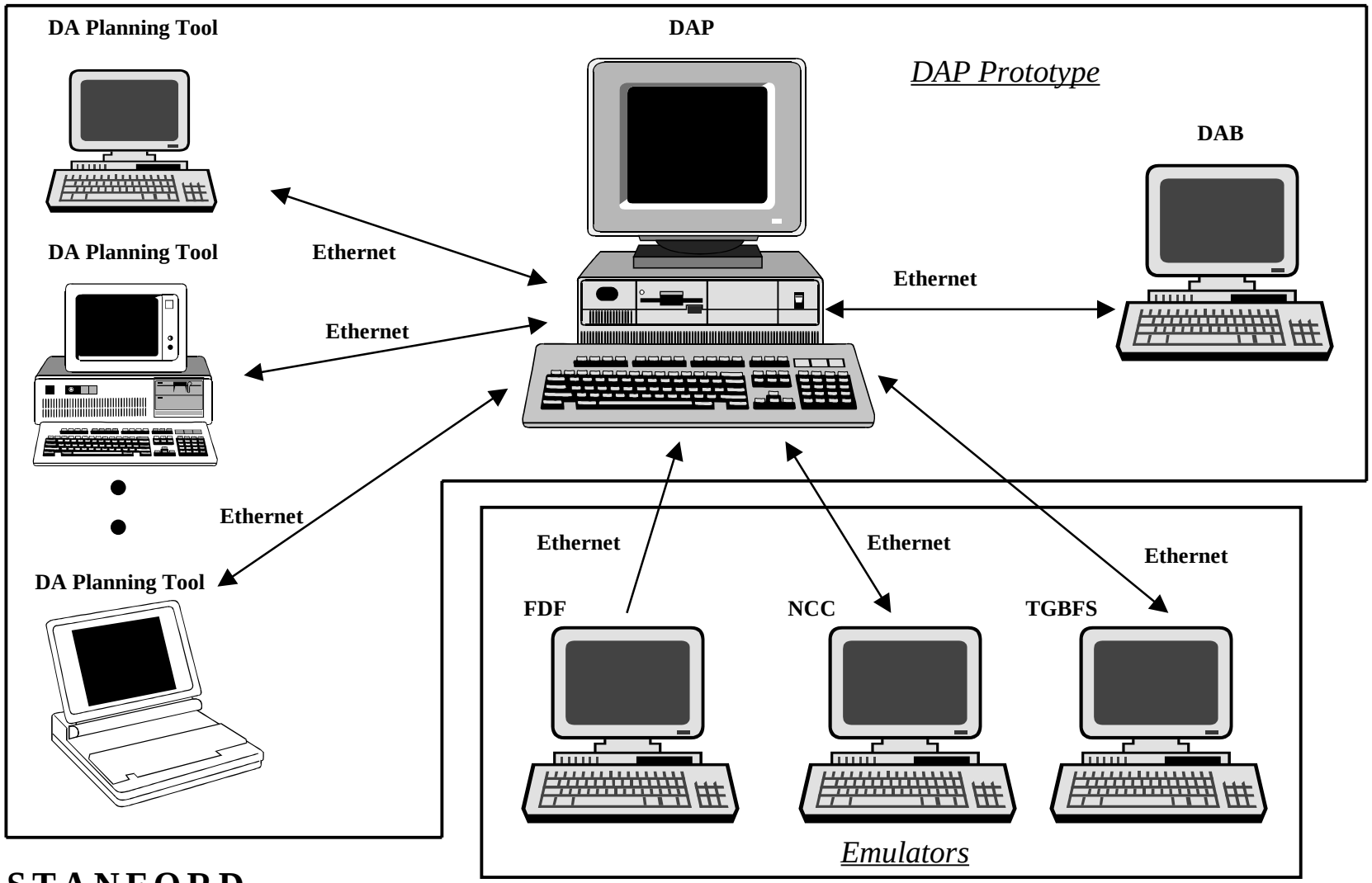
- DAP Prototype Test Bed Functions allocation to hardware
  - HW architecture overview
- DAP Prototype Test Bed Functions allocation to software
  - DFD and interface data content
  - Software function processing
  - High-level software module control hierarchy
- DAP Function (1.2) Process Issues

Preliminary Design Assumptions

- Test bed consists of the DAP Prototype and the external emulators
- NCC, FDF, and TGBFS emulators are external entities that interact with the DAP Prototype
- DAP Function (1.2), DAB Function (1.3), FDF Emulator Function (4.0), TGBFS Function (2.0), and NCC Emulator Function (3.0) reside on their own platforms
- DAP Planning Tool Function (1.1) can be instantiated N times on N different platforms and all are simultaneously serviced by the DAP

DAP Prototype Test Bed Hardware Architecture

DAP Prototype Test Bed Hardware



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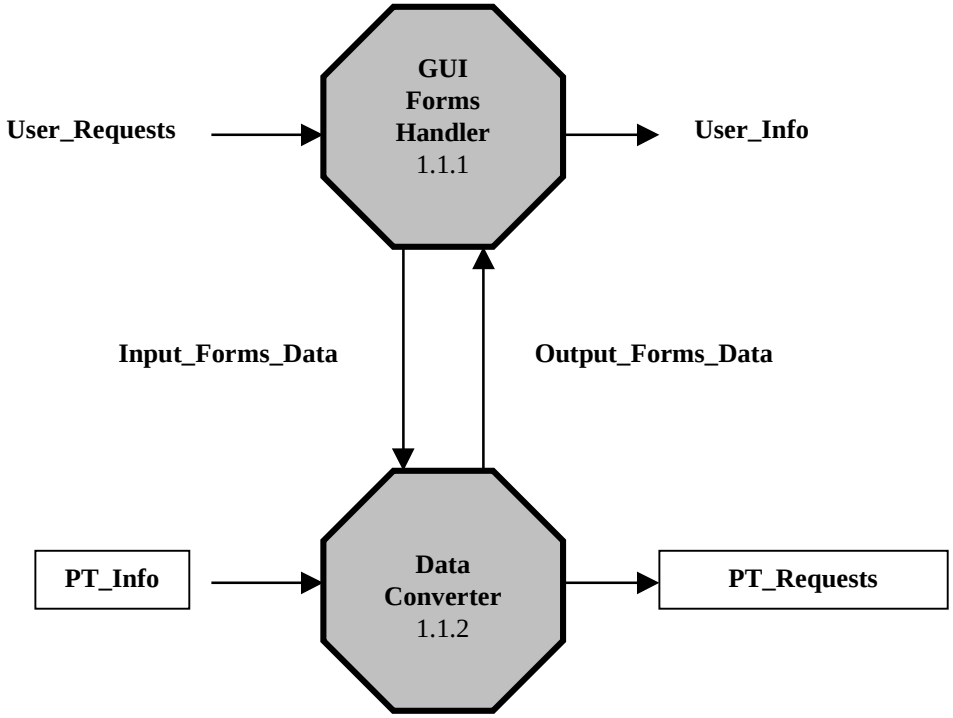
DAP Prototype Function Preliminary Design

DA Planning Tool Function (1.1) Preliminary Design DFD



DA Planning Tool Function (1.1) Preliminary Design Interfaces

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
User_Requests	N/A	DAP User	GUI Forms Hander Function (1.1.1)	• Form fill data for planning or service requests
User_Infor	N/A	GUI Forms Hander Function (1.1.1)	DAP User	• Report forms from planning and service information
PT_Info	N/A	DAP Function (1.2)	Data Converter Function (1.1.2)	• Planning and service reports in DAP internal format
PT_Requests	N/A	Data Converter Function (1.1.2)	DAP Function (1.2)	• Planning and service requests in DAP internal format
Input_Data_Formats	N/A	GUI Forms Hander Function (1.1.1)	Data Converter Function (1.1.2)	• Input data collected from forms
Output_Data_Formats	N/A	Data Converter Function (1.1.2)	GUI Forms Hander Function (1.1.1)	• Output data for display by forms

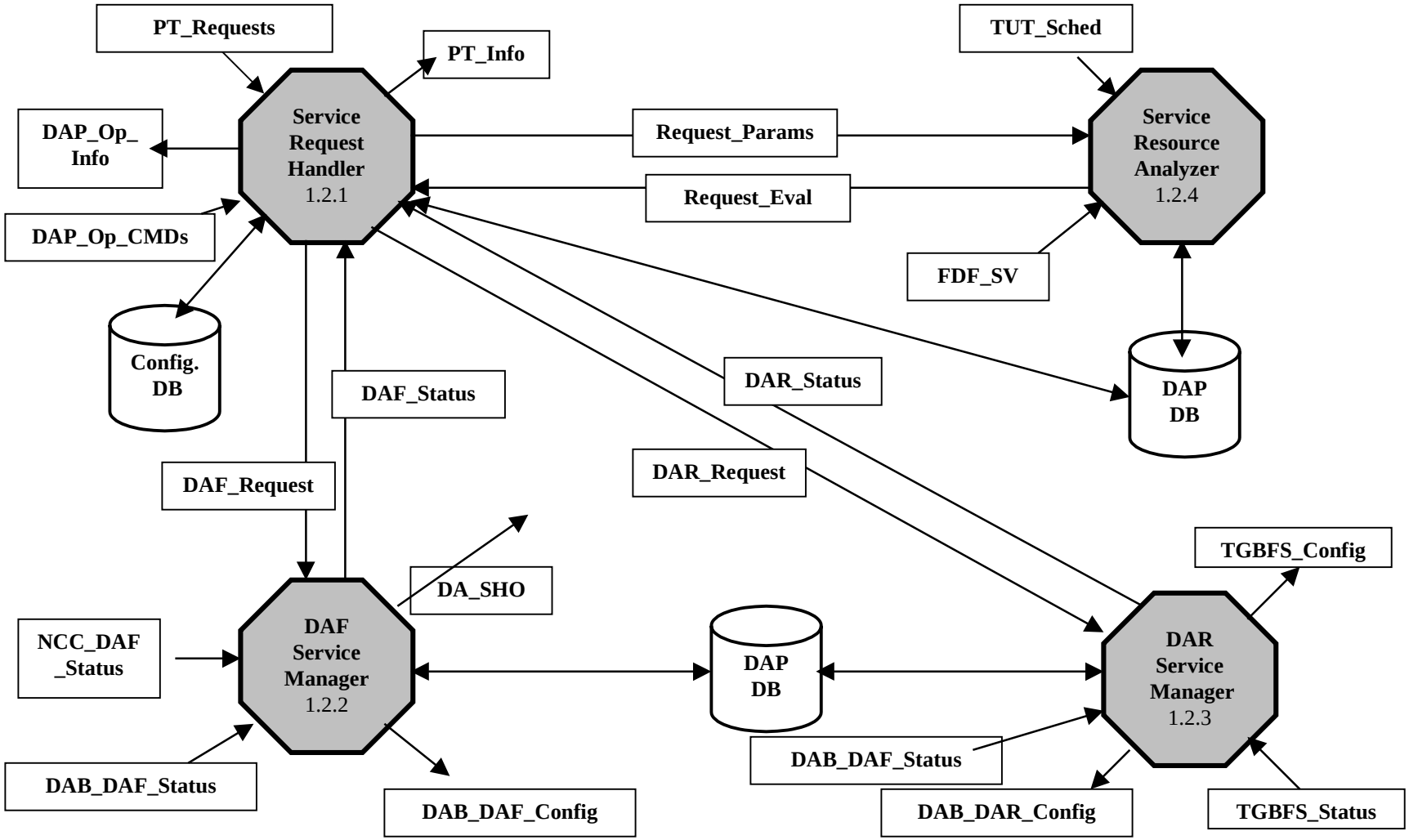
GUI Forms Handler Function (1.1.1) Processing

- If a DAP User request or a Data Converter Function (1.1.2) output is received, the GUI Forms Handling Function (1.1.1) does the following:
  - Presents the DAP User with the appropriate input form based on the nature of the user request (planning information or MA service)
  - Extracts the data from the form and sends it to the Data Converter Function (1.1.2)
  - Displays the appropriate output report form and displays it to the DAP User

Data Converter Function (1.1.2) Processing

- If GUI Forms Handler Function (1.1.1) or a DAP Function (1.2) output is received, the Data Converter Function (1.1.2) does the following:
  - Data from the GUI Forms Handler function is converted into internal DAP representation for use by the DAP Function (1.2)
  - Data from the DAP Function (1.2) is converted into forms presentation format for use by the GUI Forms Handler

DAP Function (1.2) Preliminary Design DFD



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DAP Function (1.2) Preliminary Design Interfaces

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
DA_SHO	N/A	DAF Service Manager Function (1.2.2)	NCC Emulator	• Requests for normal MAF service within the TUT schedule • TDRSS and DAF resource reports
DAP_Op_CMDS	N/A	DAP Operator	Service Request Handler Function (1.2.1)	• DAP system configuration data
DAP_Op_Info	N/A	Service Request Handler Function (1.2.1)	DAP Operator	• System configuration and status reports
FDF_SV	N/A	FDF Emulator	Service Resource Analyzer Function (1.2.4)	• USAT and TDRSS state vectors
TUT_Sched	NCC_TUT	NCC Emulator	Service Resource Analyzer Function (1.2.4)	• TUT schedules
PT_Info	N/A	Service Request Handler Function (1.2.1)	DA Planning Tool Function (1.1)	• Planning and service reports in DAP internal format
PT_Request	N/A	DA Planning Tool Function (1.1)	Service Request Handler Function (1.2.1)	• Planning and service requests in DAP internal format
TGBFS_Config	N/A	DAR Service Manager Function (1.2.3)	TGBFS Emulator	• MAR service hardware and software configuration data • TGBFS system configuration and direction cosines data
TGBFS_Status	N/A	TGBFS Emulator	DAR Service Manager Function (1.2.3)	• TGBFS service and equipment status

DAP Function (1.2) Preliminary Design Interfaces (Continued)

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
NCC_DAF_Status	NCC_TUT	NCC Emulator	DAF Service Manager Function (1.2.2)	• DAF service implementation status
DAB_DAF_Config	N/A	DAF Service Manager Function (1.2.2)	DAB Function (1.3)	• Configuration for DAF service data buffering
DAB_DAR_Config	N/A	DAR Service Manager Function (1.2.2)	DAB Function (1.3)	• Configuration for DAR data buffering
DAB_DAF_Status	N/A	DAB Function (1.3)	DAF Service Manager Function (1.2.2)	• Status for DAF service data buffering
DAB_DAR_Status	N/A	DAB Function (1.3)	DAR Service Manager Function (1.2.2)	• Status for DAR data buffering
Request_Params	N/A	Service Request Handler Function (1.2.1)	Service Resource Analyzer Function (1.2.4)	• Planning information request specifications • DA service validation request specifications
Request_Eval	N/A	Service Resource Analyzer Function (1.2.4)	Service Request Handler Function (1.2.1)	• Planning information reports • Service request resource availabilty verification report

DAP Function (1.2) Preliminary Design Interfaces (Continued)

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
DAF_Request	N/A	Service Request Handler Function (1.2.1)	DAF Service Manager Function (1.2..2)	• DAF service configuration specifications
DAF_Status	N/A	DAF Service Manager Function (1.2..2)	Service Request Handler Function (1.2.1)	• DA service buffering, formatting, and routing status reports
DAR_Request	N/A	Service Request Handler Function (1.2.1)	DAR Service Manager Function (1.2..3)	• DAR service configuration specifications
DAR_Status	N/A	DAR Service Manager Function (1.2..3)	Service Request Handler Function (1.2.1)	• DAR service configuration status

Service Request Handler Function (1.2.1) Processing

- For each service request and system control request input, the Service Request Handler Function responds in the following manner:
  - If a DA Planning Tool request is received, the function does the following:
    - > Manages an arbitrary number of DA Planning Tool Function (1.1) instantiations
    - > Manages the DAP User requests with a FIFO queue (with an emergency service request contingency priority exception)
    - > Sends the planning and service request to the Service resource Analyzer Function (1.2.4)
    - > Accepts the Service Resource Analyzer Function (1.2.4) analysis results for planning information and service request evaluations
    - > Verifies that DAF and DAR service requests and Service Reconfiguration Orders (SROs) are valid based on the Service Resource Analyzer Function (1.2.4) and then directs the appropriate service manager to implement valid requests
    - > Reports invalid service planning information of service implementation request specifications to the DAP User

Service Request Handler Function (1.2.1) Processing (Continued)

- > Transforms Service Resource Analyzer Function (1.2.4) output into a report form to be sent to the DA Planning Tool Function (1.1)
- > Sends valid DAF and DAR service configuration parameters to the DAF Service Manager Function (1.2.2) and the DAR Service Manager Function (1.2.3), respectively
- > Manages DAP User requests by keeping a database of users and their status relative to the stage of request implementation

• If a DAP Operator system control request is received, the function does the following:

- > Accepts DAP Operator system control request and assesses the validity of the request
- > Orchestrates the activities associated with DAP Operator request for configuring, cold starting, warm starting, and terminating the DAP by sending system control commands to the DAF Service Manager Function (1.2.2) , the DAR Service Manager Function (1.2.3), and the Service Resource Analyzer Function (1.2.4)
- > Maintains system configuration data (in the Configuration Database) and applies it to initialize the DAP at start-up

Service Request Handler Function (1.2.1) Processing (Continued)

- If a DAF Service Manager Function (1.2.2), DAR Service Manager Function (1.2.3), or a Service Resource Analyzer status report is received, the function does the following:
  - > Constructs and sends service progress status reports to the DA Planning Tool Function (1.1)

DAF Service Manager Function (1.2.2) Processing

- For each DAF service request and DAB Function status input, the DAF Service Manager Function responds in the following manner:
  - If a DAF service request is received, the function does the following:
    - > Accepts requests for DAF services from the Service Request Handler Function (1.2.1)
    - > Constructs a SHO-like message for DAF service implementation using request specifications
    - > Sends the SHO-like message to the NCC Emulator to obtain a MAF service
    - > Sends MAF service status reports from the NCC Emulator to the Service Request Handler Function (1.2.1)
    - > Sends DAF service reports to the Service Handler Function (1.2.1)
    - > Records DAF service allocation specifications in the DAP Database
    - > Constructs DAF service buffering, formatting, and routing specifications and sends them to the DAB Function (1.2.2)

DAF Service Manager Function (1.2.2) Processing (Continued)

- If a system control request is received, the function does the following depending on the request specifications:
  - > Installs necessary system configuration parameters
  - > Performs startup or termination operations
- If a DAB Service Manager Function (1.3.1) DAF status report is received, the function does the following:
  - > Accepts DAF buffering, formatting, and routing status reports from the DAB Function (1.3) and records the current state of operations in the DAP Database
  - > Constructs and sends service progress status reports to the Service Request Handler Function (1.2.1)
  - > Constructs system control reports for the DAP Operator and sends them to the Service Request Handler Function (1.2.1)
  - > Extracts system control status and test information from the DAP Database for reporting to the Service Request Handler Function (1.2.1)

DAR Service Manager Function (1.2.3) Processing

- For each DAR service request, system control request, TGBFS Emulator, and DAB Function status input, the DAR Service Manager Function responds in the following manner:
  - If a DAR service request for DAP equipment is received, the function does the following:
    - > Accepts requests for DAR services from the Service Request Handler Function
    - > Manages the service requirements for DAR users
    - > Records DAR service allocation specifications in the DAP Database
    - > Accepts DAB Function (1.2) DAR buffering status reports and records the current state of operations in the DAP Database
    - > Constructs DAR service buffering, routing, and formatting requests and sends them to the DAB Service Manager Function (1.2.1)
    - > Transforms the DAR service request into a representation that can be used by the DAR equipment chain controllers to implement the desired service specifications and forwards it to them
    - > Computes direction sine and cosines and sends them to the TGBFS at 1 second intervals during the return service

DAR Service Manager Function (1.2.3) Processing (Continued)

- > Extracts satellite ephemeris from the DAP Database and uses it to calculate direction sine and cosine information for the TGBFS Emulator to support existing DAR services
- > Sends DAR service specifications to the TGBFS Emulator to be used in controlling the simulated TGBFS Functions while the service is implemented
- > Accepts status reports from the TGBFS Emulator
- > Sends DAR service status reports to the Service Handler Function (1.2.1)

- If a system control request is received, the function does the following depending on the request specifications:
  - > Installs necessary system configuration parameters
  - > Performs necessary startup or termination operations
- If a DAB Service Function (1.3.1) DAR status report or a TGBFS Emulator is received, the function does the following:
  - > Accepts DAR buffering, formatting, and routing status reports, performance monitoring status reports, and system control test reports from the DAB Function (1.2.2) and records the current state of operations in the DAP Database

DAR Service Manager Function (1.2.3) Processing (Continued)

- Accepts DAR equipment controller status reports from the TGBFS Emulator and records the current state of operations in the DAP Database
- Extracts system control status and test information from the DAP Database for reporting to the Service Request Handler Function (1.2.1)
- Constructs and sends service progress status reports to the Service Request Handler Function (1.2.1.1)
- Constructs system control reports for the DAP Operator and sends them to the Service Request Handler Function (1.2.1)

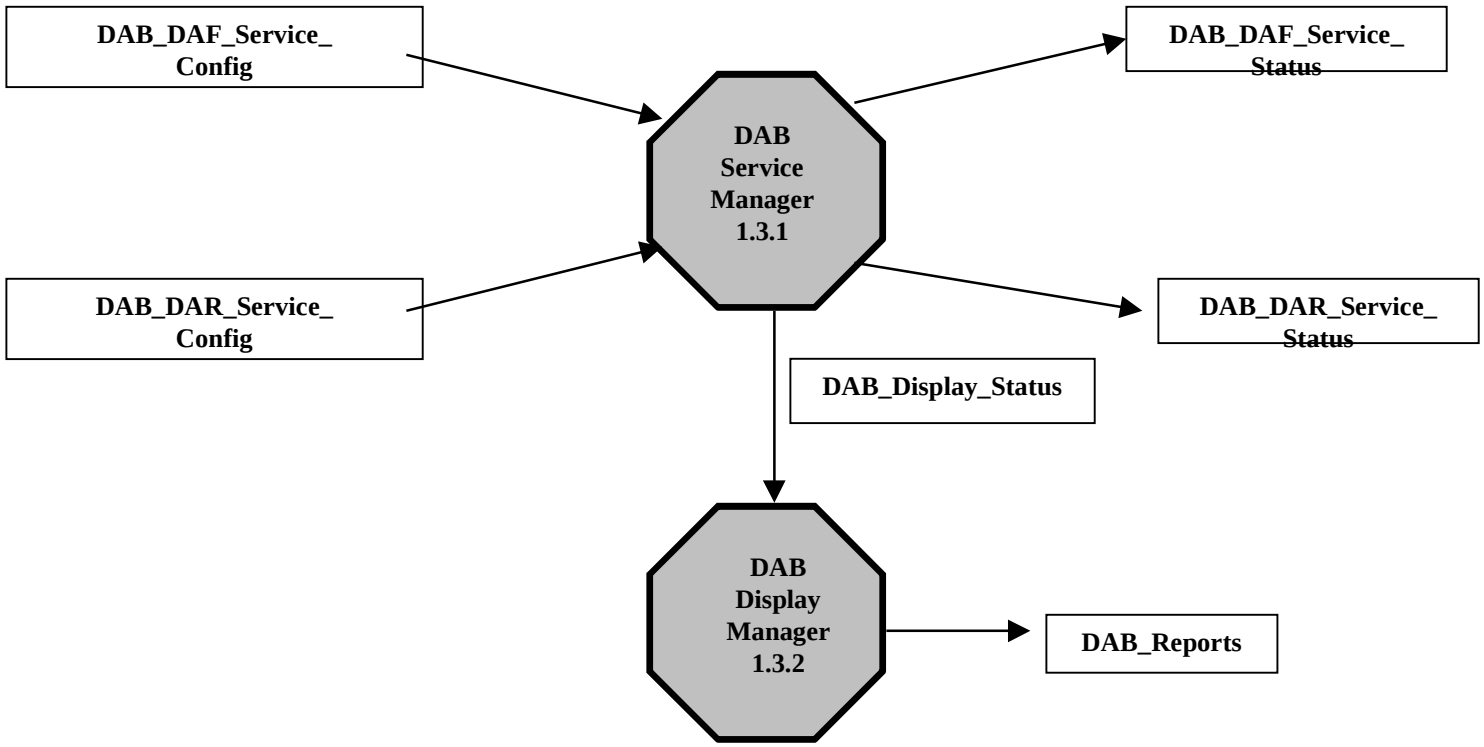
Resource Analyzer Function (1.2.4) Processing

- For each service analysis request, NCC Emulator input and FDF Emulator input, the Service Analyzer Function responds in the following manner:
  - If a service analysis request is received, the function does the following depending on the request specifications:
    - > Accepts service analysis requests and extracts specifications for the service assessment
    - > Superimposes (Boolean “anded”) optional DAP User defined visibility constraints on the omni-directional visibility profiles automatically produced by this function
    - > Extracts DA resource information from the DAP database for planning and service request assessments
    - > Assesses visibility and resource availability in order to determine the service allocation constraints associated with the request
    - > Evaluates DAP User service requests and validates based on consistency with DAS resource availability and visibility constraints
    - > Constructs planning information reports based on the results of the analysis of the DAS resource availability and visibility constraints

Resource Analyzer Function (1.2.4) Processing (Continued)

- If a NCC or FDF input is received, the function does the following depending on the type of data:
  - > Accepts NCC TUT schedules and transforms them into a format for use in visibility analysis and records in the DAP Database
  - > Deletes active TUT schedules when a new schedule arrives
  - > Maintains an updated version of the TUT with scheduled DAP User services superimposed on the dynamic TUT
  - > Accepts FDF satellite ephemerides to support visibility analysis and records in the DAP Database
  - > Calculates direction cosines for the position vector between the TDRS and USAT for real-time TGBFS return service configuration support
  - > Propagates and interpolates ephemeris data to provide continuous predicted user platform and TDRS location through the MAF and DAR services
- If a system control request is received, the function does the following depending on the request specifications:
  - > Installs necessary system configuration parameters
  - > Performs necessary startup or termination operations

DAB Function (1.3) Preliminary Design DFD



DAB Function (1.3) Preliminary Design Interfaces

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
DAB_DAF_ Service_Config	N/A	DAP Function (1.2)	DAB Service Manager Function (1.3.1)	• DAF service configuration parameters
DAB_DAR_ Service_Config	N/A	DAP Function (1.2)	DAB Service Manager Function (1.3.1)	• DAR service configuration parameters
DAB_DAF_ Service_Status	N/A	DAB Service Manager Function (1.3.1)	DAP Function (1.2)	• DAF service configuration status
DAB_DAR_ Service_Status	N/A	DAB Service Manager Function (1.3.1)	DAP Function (1.2)	• DAR service configuration status
DAB_Display_Status	N/A	DAB Service Manager Function (1.3.1)	DAB Display Manager Function (1.3.2)	• Report data in internal representation
DAB_Reports	N/A	DAB Display Manager Function (1.3.2)	DAB Operator	• Output data for display by forms

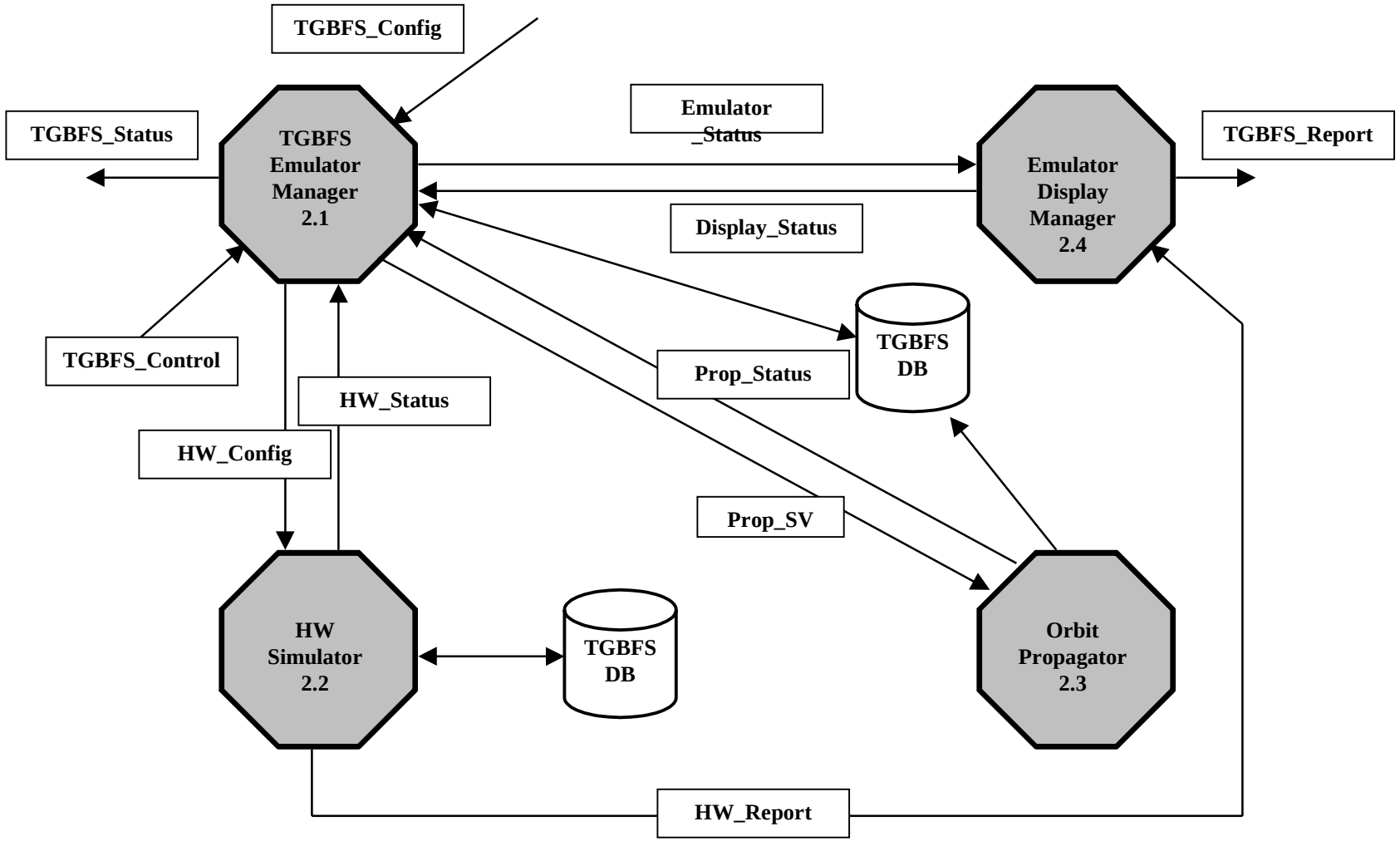
DAB Service Manager (1.3.1) Function Processing

- For each service configuration request and system control request received, the DAB Service Manager Function responds in the following manner:
  - If a service configuration request is received, the function does the following:
    - > Transforms service buffering, formatting, and routing specifications into simulated forward and return service configuration directives and maintains a database of services in progress
    - > Constructs status reports from the data buffering, routing, and formatting from the simulated services in progress and sends to the DAP function (1.2)
    - > Provides the DAB Display Manager Function (1.3.2) with reports for local display

DAB Display Manager (1.3.2) Function Processing

- When data is received from the DAB Service Manager Function (1.3.1), the DAB Display Manager (1.3.2) Function does the following
  - Formats a text report containing service configuration results
  - Formats text service start and stop time messages
  - Displays text reports locally

TGBFS Emulator Function (2.0) Preliminary Design DFD



TGBFS Emulator Function (2.0) Preliminary Design Interfaces

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
TGBFS_Config	N/A	DAP Prototype Function (1.0)	TGBFS Emulator Manager Function (2.1)	• TGBFS equipment and DA service configuration data (IBUG selection) • TGBFS equipment test requests • Real-time direction cosines
TGBFS_Control	N/A	TGBFS Emulator Operator	TGBFS Emulator Manager Function (2.1)	• Emulator control specifications
TGBFS_Report	N/A	TGBFS Emulator Manager Function (2.1)	TGBFS Emulator Operator	• Emulator status • Propagated ephemerides
TGBFS_Status	N/A	TGBFS Emulator Manager Function (2.1)	DAP Prototype Function (1.0)	• TGBFS equipment performance monitoring and fault isolation reports in internal DAS format
HW_Config	N/A	TGBFS Emulator Manager Function (2.1)	HW Simulator Function (2.2)	• System and service configuration specifications
HW_Status	N/A	HW Simulator Function (2.2)	TGBFS Emulator Manager Function (2.1)	• Status reports for reporting to DAP
HW_Reports	N/A	HW Simulator Function (2.2)	Emulator Display Manager Function (2.4)	• Status reports for displaying on the local emulator screen
Prop_SV	N/A	TGBFS Emulator Manager Function (2.1)	Orbit Propagator Function (2.3)	• Satellite ID, time interval, and initial state vector for use in ephemeris generation

TGBFS Emulator Function (2.0) Preliminary Design Interfaces (Continued)

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
Prop_Status	N/A	Orbit Propagator Function (2.3)	TGBFS Emulator Manager Function (2.1)	• Status reports indicating the state of ephemeris generation processing
Emulator_Status	N/A	TGBFS Emulator Manager Function (2.1)	Emulator Display Manager Function (2.4)	• Overall emulator status information for local display

TGBFS Emulator Manager Function (2.1) Processing

- The TGBFS Emulator Manager receives input from the TGBFS Emulator Operator, DAP Prototype Function (1.0), HW Simulator Function (2.2), or Orbit Propagator Function (2.3), it responds as follows:
  - If the input is from the TGBFS Emulator Operator, the TGBFS Emulator Function does the following:
    - > Performs local system initialization functions for startup requests
    - > Performs shut down operations for termination requests
    - > Extracts ephemerides from the TGBFS Database for export purposes
  - If the input is from the DAP Prototype Function, the TGBFS Emulator Function does the following:
    - > Provides the HW Simulator Function with HW configuration specifications
    - > Indicates that direction sine and cosines have been received via status to the Emulator Display Manager Function (2.4)
    - > Provides satellite state vectors to the Orbit Propagator Function (2.3)

TGBFS Emulator Manager Function (2.1) Processing (Continued)

- If the input is from the HW Simulator Function, the TGBFS Emulator Function does the following:
  - > Forwards the simulated HW status reports to the DAP Prototype Function (1.0)
- If the input is from the Orbit Propagator Function, the TGBFS Emulator Function does the following:
  - > Reports the status of the ephemeris generation process to the Emulator Display Manager Function (2.4)

HW Simulator Function (2.2) Processing

- If the HW Simulator receives input from the TGBFS Emulator Function, it responds as follows:
  - Updates the TGBFS Database based on HW configuration specifications
  - Reports the current simulated HW status to the Emulator Display Manager Function (2.4)

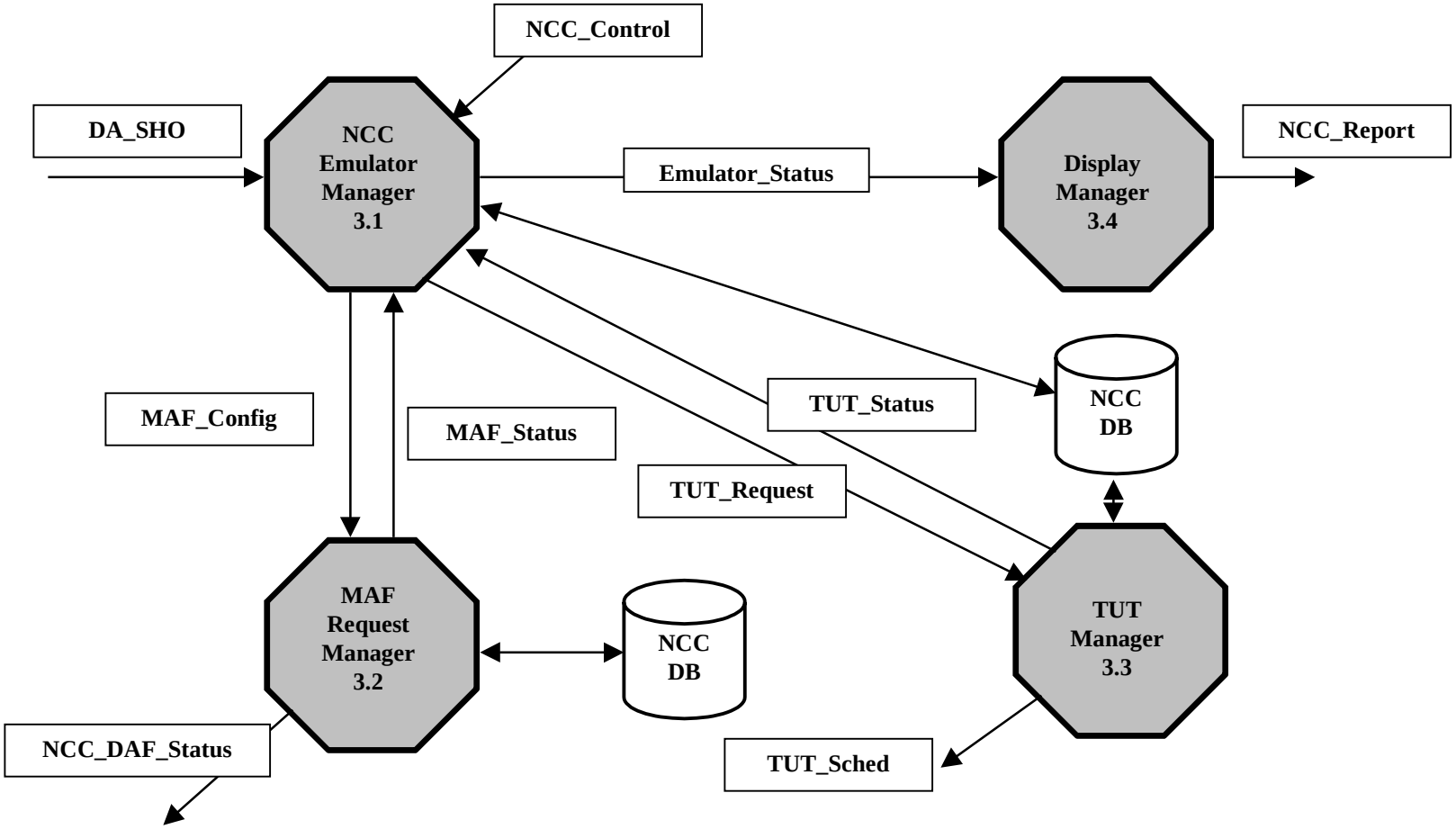
Orbit Propagator Function (2.3) Processing

- If the Orbit Propagator receives input from the TGBFS Emulator Function, it responds as follows:
  - Propagates state vectors for each satellite over specified time interval and stores ephemerides in TGBFS Database for retrieval
  - Sends ephemeris generation completion status to the TGBFS Emulator Function

Emulator Display Manager Function (2.4) Processing

- If the Emulator Display Manager receives input from the TGBFS Emulator Function or HW Simulator Function, it responds as follows:
  - Displays ephemeris generator status
  - Displays ephemeris retrieval and export status
  - Displays the current simulated HW status

NCC Emulator Function (3.0) Preliminary Design DFD



NCC Emulator Function (3.0) Preliminary Design Interfaces

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
TUT_Sched	NCC_TUT	TUT Manager Function (3.3)	DAP Prototype Function (1.0)	• Daily NCC TUT schedules for DAF allocation use • Status of DAF service requests
DA_SHO	N/A	DAP Prototype Function (1.0)	NCC Emulator Manager Function (3.1)	• Requests for normal MAF service within the TUT schedule • Requests for existing MAR equipment chain to support DAR services • TDRSS resource reports
NCC_Report	N/A	Display Manager Function (3.4)	NCC Emulator Operator	• Emulator status
NCC_Control	N/A	NCC Emulator Operator	NCC Emulator Manager Function (3.1)	• NCC TUT schedules • Commands to send TUT schedules • System control commands
MAF_Config	N/A	NCC Emulator Manager Function (3.1)	MAF Request Manager Function (3.2)	• Specifications for MAF service
NCC_DAF_Status	NCC_TUT	MAF Request Manager Function (3.2)	DAP Prototype Function (1.0)	• Status of MAF service request for DAP usage
MAF_Status	N/A	MAF Request Manager Function (3.2)	NCC Emulator Manager Function (3.1)	• Status of MAF service request for local display

NCC Emulator Function (3.0) Preliminary Design Interfaces (Continued)

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
TUT_Request	N/A	NCC Emulator Manager Function (3.1)	TUT Manager Function (3.3)	• Request to construct DAP TUT from NCC TUT • Request to send DAP TUT to DAP
TUT_Status	N/A	TUT Manager Function (3.3)	NCC Emulator Manager Function (3.1)	• Status of requested operations
Emulator_Status	N/A	NCC Emulator Manager Function (3.1)	Display Manager Function (3.4)	• Emulator status for local display

NCC Emulator Manager Function (3.1) Processing

- When the NCC Emulator Manager receives input from the NCC Emulator Operator, DAP Function (1.0), MAF Request Manager Function (3.2), or TUT Manager Function (3.3), it responds as follows:
  - If the input is from the NCC Emulator Operator, the NCC Emulator Manager Function does the following:
    - > Performs required initialization and termination activities at system start up and shut down, respectively
    - > Accepts NCC TUTs as inputs for storage in NCC Database
    - > Accepts requests to convert NCC TUTs into DAP Prototype format and store in the NCC Database
    - > Accepts requests to retrieve and send TUTs to the DAP Function (1.0)

NCC Emulator Manager Function (3.1) Processing (Continued)

- If the input is from the DAP Function (1.0), the NCC Emulator Manager Function does the following:
  - > Accepts specifications for MAF service requests
  - > Notifies the MAF Request Manager Function (3.2) of the request and supplies it with the specifications
  - > Notifies the Display Manager Function (3.4) of the request receipt for local display presentation
  - > Accepts requests to delete a TUT schedule from the NCC Database and removes that schedule
- If the input is from the MAF Request Manager Function (3.2), the NCC Emulator Manager Function does the following:
  - > Accepts MAF Manager service installation progress status
  - > Sends MAF service installation progress status to the the Display Manager Function (3.4) for local display presentation

MAF Request Manager Function (3.2) Processing

- If the input is from the TUT Manager Function (3.3), the NCC Emulator Manager Function does the following:
  - > Accepts operations status and supplies the status to the Display Manager Function (3.4) for local display presentation

- When the MAF Request Manager receives input from the NCC Emulator Manager Function (3.1) , it responds as follows:
  - Logs request specifications in NCC Database
  - Compares request specifications to existing service requests in order to determine validity of the request
  - Reports service request implementation successes or failures to the NCC Emulator Manager Function (3.1)
  - Removes service specifications from the NCC Database after the service time expires

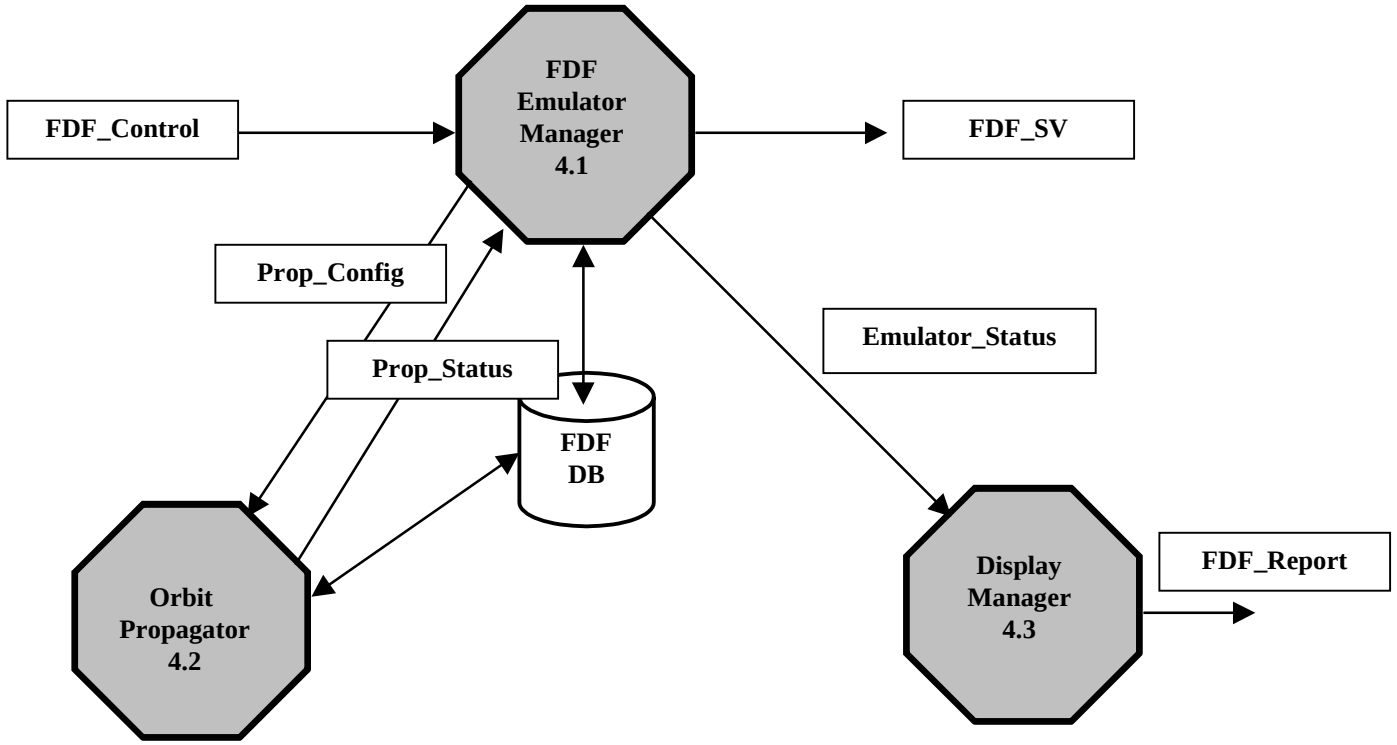
TUT Manager Function (3.3) Processing

- When the TUT Manager receives input from the NCC Emulator Manager Function (3.1) , it responds as follows:
  - Request for TUT format conversion from NCC to DAP format induces the following actions
    - > NCC TUT is retrieved from NCC Database
    - > Processing converts the NCC TUT to DAP format
    - > DAP TUT is stored in the NCC Database
  - Requests for TUT broadcasts to the DAP induce the following actions
    - > DAP TUT is extracted from the NCC Database and broadcast to the DAP Function (1.0)

Display Manager Function (3.4) Processing

- When the Display Manager receives inputs from the NCC Emulator Manager (3.1), it responds as follows:
  - Status information is written to the local display in text format

FDF Emulator Function (4.0) Preliminary Design DFD



FDF Emulator Function (3.0) Preliminary Design Interfaces

DATA FLOW NAME	PARENT FLOW	SOURCE	DESTINATION	CONTENTS
FDF_SV	N/A	FDF Emulator Manager Function (4.1)	DAP Prototype Function (1.0)	• Satellite state ephemerides • Attitude correction data
FDF_Report	N/A	Display Manager Function (4.3)	FDF Emulator Operator	• Emulator status
FDF_Control	N/A	FDF Emulator Operator	FDF Emulator Manager Function (4.1)	• Satellite IDs and state vectors • System control commands • Requests to broadcast ephemerides
Prop_Config	N/A	FDF Emulator Manager Function (4.1)	Orbit Propagator Function (4.2)	• Specifications for state vector propagation
Prop_Status	N/A	Orbit Propagator Function (4.2)	FDF Emulator Manager Function (4.1)	• Operational state of ephmeris generation
Emulator_Status	N/A	FDF Emulator Manager Function (4.1)	Display Manager Function (4.3)	• Status reports for local display

FDF Emulator Manager Function (4.1) Processing

- When the FDF Emulator Manager receives input from the FDF Emulator Operator or Orbit Propagator Function (4.2), it responds as follows:
  - If the input is from the FDF Emulator Operator, the NCC Emulator Manager Function does the following:
    - > Performs system initialization and termination at system start up and shutdown, respectively
    - > Accepts state vectors and stores them in the FDF Database
    - > Accepts criteria (start and stop times, step size, etc.) for ephemeris generation and stores them in the FDF Database
    - > Accepts requests for satellite ephemeris broadcasts, extracts designated ephemerides and attitude correction tables from the FDF Database, and sends them to the DAP Function (1.0)
    - > Accepts requests to delete an ephemeris from the FDF Database and removes that ephemeris

Orbit Propagator Function (4.2) Processing

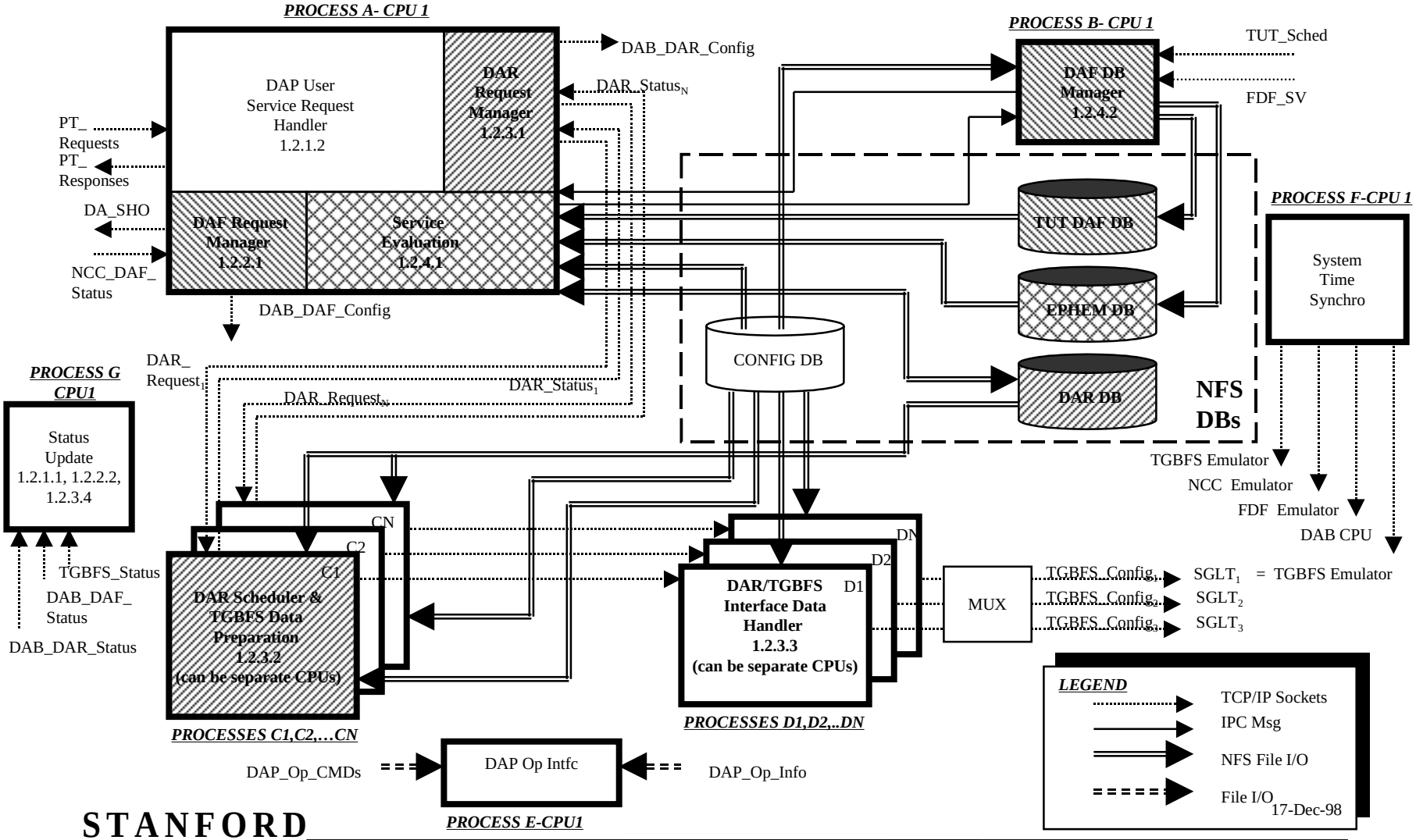
- When the Orbit Propagator receives input from the FDF Emulator Manager (4.1), it responds as follows:
  - Extracts the state vector and ephemeris generation specifications from the FDF Database
  - Uses the ephemeris specifications to propagate the state vector and generates an ephemeris that is stored in the FDF Database
  - Provides status on the propagation operations to the FDF Manager Function (4.2)
  - Generates attitude correction angle schedule that parallels the ephemeris tables

Display Manager Function (3.4) Processing

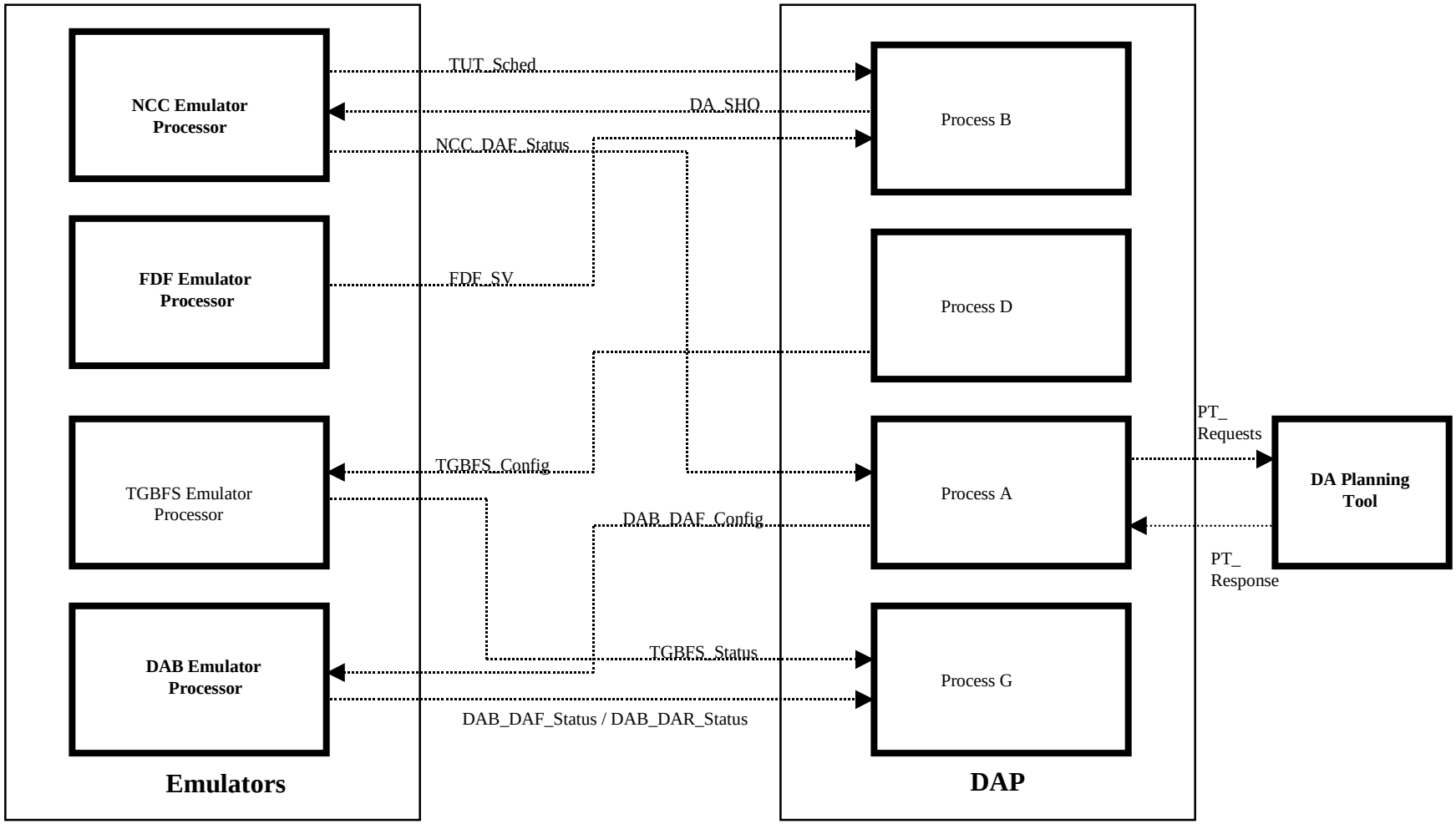
- When the Display Manager receives inputs from the FDF Emulator Manager (4.1), it responds as follows:
  - Status information is written to the local display in text format

DAP Prototype Software and Hardware Architectures

Final DAP Function (1.2) DFDs to DAP Processes Allocation



Process TCP/IP External Interfaces



Preliminary Hardware Architecture